A Typology of 7-Line Base Images for *n* between 8 and 25

8	***n***	*If |***E***|=VCF=SCF=1		VCF > 1
21	***S***	line range	144, 192	
J	***k*** = 1	***k*** = 2	***k*** = 3	
1	7,1	7,2	7,3	
2	7,2	7,3	7,1	2
3	7,3 ◬	Fat Arrow	3SST	

*Line range is ***n*** * (***S*** -3) to ***n*** * (***S*** +3)

9	***n***	*If |***E***|=VCF=SCF=1		VCF > 1
21	***S***	line range	162, 216	
J	***k*** = 1	***k*** = 2	***k*** = 3	
1	7,1	7,2	7,3	
2	7,2	7,3	7,1	
3	7,3	5,1	7,2 T	3
4	✈ -Glider	↓Δ base	∇ IOC ◇	

10	***n***	*If |***E***|=VCF=SCF=1		VCF > 1
21	***S***	line range	180, 240	
J	***k*** = 1	***k*** = 2	***k*** = 3	
1	7,1	7,2	7,3	
2	7,2	7,3	7,1	2
3	7,3	7,1	7,2	
4	7,3 sb	7,1 sb	7,2 sb	2

11	***n***	*If |***E***|=VCF=SCF=1		VCF > 1
21	***S***	line range	198, 264	
J	***k*** = 1	***k*** = 2	***k*** = 3	
1	7,1	7,2	7,3	
2	7,2	7,3	7,1	
3	7,3	7,1	7,2	
4	7,3	7,1	7,2	
5	3SST	7,3 D ◬	Fat Arrow	

12	***n***	*If |***E***|=VCF=SCF=1		VCF > 1
21	***S***	line range	216, 288	
J	***k*** = 1	***k*** = 2	***k*** = 3	
1	7,1	7,2	7,3	
2	7,2	7,3	7,1	2
3	7,3	7,1	7,2	3
4	7,3	5,1	7,2 T	4
5	7,2	7,3	7,1	

13	***n***	*If |***E***|=VCF=SCF=1		VCF > 1
21	***S***	line range	234, 312	
J	***k*** = 1	***k*** = 2	***k*** = 3	
1	7,1	7,2	7,3	
2	7,2	7,3	7,1	
3	7,3	7,1	7,2	
4	7,3	7,1	7,2	
5	∇ IOC ◇	✈-Glider	7,1 nc	

n is prime so all J have VCF = 1

15	***n***	*If |***E***|=VCF=SCF=1		VCF > 1
21	***S***	line range	270, 360	
J	***k*** = 1	***k*** = 2	***k*** = 3	
1	7,1	7,2	7,3	
2	7,2	7,3	7,1	
3	7,3	7,1	7,2	3
4	7,3	7,1	7,2	
5	7,2 T	7,3	5,1	5
6	7,1 sb	7,2 sb	7,3 sb	3
7	**7,1 S**	**7,2 S**	**7,3 S**	

J **multiples of 7 are small images.**

16	***n***	*If |***E***|=VCF=SCF=1		VCF > 1
21	***S***	line range	288, 384	
J	***k*** = 1	***k*** = 2	***k*** = 3	
1	7,1	7,2	7,3	
2	7,2	7,3	7,1	2
3	7,3	7,1	7,2	
4	7,3	7,1	7,2	4
5	7,2	7,3	7,1	
6	Fat Arrow	3SST	7,3 ◬	2
7	7,2 S	7,3 S	7,1 S	

17	***n***	*If |***E***|=VCF=SCF=1		VCF > 1
21	***S***	line range	306, 408	
J	***k*** = 1	***k*** = 2	***k*** = 3	
1	7,1	7,2	7,3	
2	7,2	7,3	7,1	
3	7,3	7,1	7,2	
4	7,3	7,1	7,2	
5	7,2	7,3	7,1	
6	7,1 nc	∇ OC ◇	✈-Glider	
7	7,3 S	7,1 S	7,2 S	
8	✈-Spy	⛉inside▲	▲ Δ base	

These are shown in "*Examples...*"

18	***n***	*If |***E***|=VCF=SCF=1		VCF > 1
21	***S***	line range	324, 432	
J	***k*** = 1	***k*** = 2	***k*** = 3	
1	7,1	7,2	7,3	
2	7,2	7,3	7,1	2
3	7,3	7,1	7,2	3
4	7,3	7,1	7,2	2
5	7,2	7,3	7,1	
6	5,1	7,2 T	7,3	6
7	7,3 S	7,1 S	7,2 S	
8	↓Δ base	∇ IOC ◇	✈-Glider	2

19	***n***	*If |***E***|=VCF=SCF=1		VCF > 1
21	***S***	line range	342, 456	
J	***k*** = 1	***k*** = 2	***k*** = 3	
1	7,1	7,2	7,3	
2	7,2	7,3	7,1	
3	7,3	7,1	7,2	
4	7,3	7,1	7,2	
5	7,2	7,3	7,1	
6	7,1	7,2	7,3	
7	7,2 S	7,3 S	7,1 S	
8	Fat ⇧	3SST	7,3 D ◬	
9	bent foot ☆	↓Δ base	∇ ICO ◇	

Nice Stacked Circle Image with *S* = 6

20	***n***	*If |***E***|=VCF=SCF=1		VCF > 1
21	***S***	line range	360, 480	
J	***k*** = 1	***k*** = 2	***k*** = 3	
1	7,1	7,2	7,3	
2	7,2	7,3	7,1	2
3	7,3	7,1	7,2	
4	7,3	7,1	7,2	4
5	7,2	7,3	7,1	5
6	7,1	7,2	7,3	2
7	7,1 S	7,2 S	7,3 S	
8	7,1 sb	7,2 sb	7,3 sb	4
9	⛉inside▲	▲ Δ base	✈-Spy	

Acronyms/Symbols

S Small image

I Inside

T two of points on line not poked out (VF is △)

nc non convex

sb small base

CO Cracked-Open

OC Overly-Closed

◬ A frame

D degenerate star, some points fail to touch opposite side

22	***n***	*If $\lvert E \rvert$=VCF=SCF=1		VCF > 1	23	***n***	*If $\lvert E \rvert$=VCF=SCF=1		VCF > 1	24	***n***	*If $\lvert E \rvert$=VCF=SCF=1		VCF > 1	25	***n***	*If $\lvert E \rvert$=VCF=SCF=1		VCF > 1
21	***S***	line range	396, 528		21	***S***	line range	414, 552		21	***S***	line range	432, 576		21	***S***	line range	450, 600	
J	***k*** = 1	***k*** = 2	***k*** = 3		J	***k*** = 1	***k*** = 2	***k*** = 3		J	***k*** = 1	***k*** = 2	***k*** = 3		J	***k*** = 1	***k*** = 2	***k*** = 3	
1	7,1	7,2	7,3		1	7,1	7,2	7,3		1	7,1	7,2	7,3		1	7,1	7,2	7,3	
2	7,2	7,3	7,1	2	2	7,2	7,3	7,1		2	7,2	7,3	7,1	2	2	7,2	7,3	7,1	
3	7,3	7,1	7,2		3	7,3	7,1	7,2		3	7,3	7,1	7,2	3	3	7,3	7,1	7,2	
4	7,3	7,1	7,2	2	4	7,3	7,1	7,2		4	7,3	7,1	7,2	4	4	7,3	7,1	7,2	
5	7,2	7,3	7,1		5	7,2	7,3	7,1		5	7,2	7,3	7,1		5	7,2	7,3	7,1	5
6	7,1	7,2	7,3	2	6	7,1	7,2	7,3		6	7,1	7,2	7,3	6	6	7,1	7,2	7,3	
7	7,1 S	7,2 S	7,3 S		7	7,2 S	7,3 S	7,1 S		7	7,3 S	7,1 S	7,2 S		7	7,3 S	7,1 S	7,2 S	
8	7,1	7,2	7,3	2	8	7,1	7,2	7,3		8	5,1	7,2 T	7,3	8	8	7,1 nc	7,2 D	7,3	
9	▽ IOC ◇	✈ -Glider	7,1 nc		9	7,2	7,3	7,1		9	3SST	7,3-◬	Fat Arrow	3	9	7,2	7,3	7,1	
10	7,3 ◬	Fat Arrow	3SST	2	10	▲ Δ base	✈ -Spy	⛉ inside▲		10	7,3	7,1	7,2	2	10	7,3 sb	7,1 sb	7,2 sb	5
					11	bent foot ☆	↓Δ base	▽ ICO ◇		11	↓Δ base	▽ **ICO** ◇	bent foot ☆		11	7,3	7,1	7,2	
						Note 23,11 is like both 19,9 and 9,4									12	3SST	7,3D ◬	Fat Arrow	
General jump patterns:			**Horizontal (as *k* changes): 7,1 to 7,2 to 7,3 to 7,1 ...**									**24,11, *k* =2 produces stacked circles with *S* = 6 or 8**							
			Vertical (as *J* changes): 7,1 to 7,2 to 7,3 to 7,3 to 7,2 to 7,1 to 7,1 S ...																

These tables provide all ***n*** between 8 and 25 that are not multiples of 7, and ***J*** < ***n***/2, for ***k*** = 1, 2, 3. An abbreviation guide is provided at the bottom of the first page and additional notes are provided to point out interesting patterns as they arise. ***n*** = 3, 4, 5, and 6 are also represented here at various points because, for each ***n***, VCF > 1 solutions are noted within the tables (so that the 5,1 and 5,2 sets are visible as 10,2 and 10,4, and the 3,1 set is visible as 9,3, for example). To conserve on space, we omit the parentheses and space and simply note these values as 5,1 rather than (***n***, ***J***) = (5, 1) here.

First, note that when ***J*** is small relative to ***n***/2, the 7-line ***S*** = 0 MOD 7, base images are 7-point stars. Once ***J*** approaches ***n***/2, more complex base images emerge.

Four of these more complex image sets are examined visually elsewhere. The specific versions of these image sets are highlighted in crème in the tables above. It is worth noting that these categories are not strict, and as ***n*** increases, these image types appear more fluid with one another (as seen in the yellow highlighted note about 23,11 above). These images are not exhaustive but are provided to show some of the main types of 7-line *single-cycle* images which become distorted when ***S*** is not divisible by 7.

Given the centrality of *Three Shape-Shifting Triangles,* 3SST, to this chapter, it is revisited and updated here. That section focused on 30,13, 8,3 and 11,5 versions of 3SST. Additional ***n***,***J*** pairs produce 3SST style images as noted in the four image sets section. These ***n***,***J*** values are sorted by magnitude of ***J/n*** to the right. This shows that such images occur over a range of ***J/n*** values. If you examine the base images for these ***n***,***J*** values, you will find that smaller values of ***J/n*** are associated with "fat" 3SST, and larger values are associated with "skinny" 3SST (interestingly, note that ***n*** = 53 has 2 versions, ***J*** = 19 and 26). Similar ratio variability exists for other style image sets as well.

J/n	3SST
0.34	29,10
0.36	53,19
0.38	8,3
0.39	59,23
0.41	27,11
0.42	19,8
0.43	30,13
0.45	11,5
0.47	36,17
0.48	25,12
0.48	31,15
0.49	53,26

There are numerous links to sections of **ESA** that could be made. Notice that when ***J*** = 7 (or multiples of 7 for that matter), small 7-point stars appear, just as discussed in E12.4. When ***S*** is not a multiple of 7, but ***J*** is a multiple of 7, the resulting images become more systematically obtained versions of *Polygons and Stars in a Cycle*, E10.5.